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THE PLANT DISEASE REPORTER

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Division of Mycology and Disease Survey

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UNITED STATES DEPARTMENT OF AGRICULTURE

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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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DIVISION OF MYCOLOGY AND DISEASE SURVEY

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STATUS OF YELLOW-RED VIROSIS IN 1940

E. M. Hildebrand and D. H. Palmiter

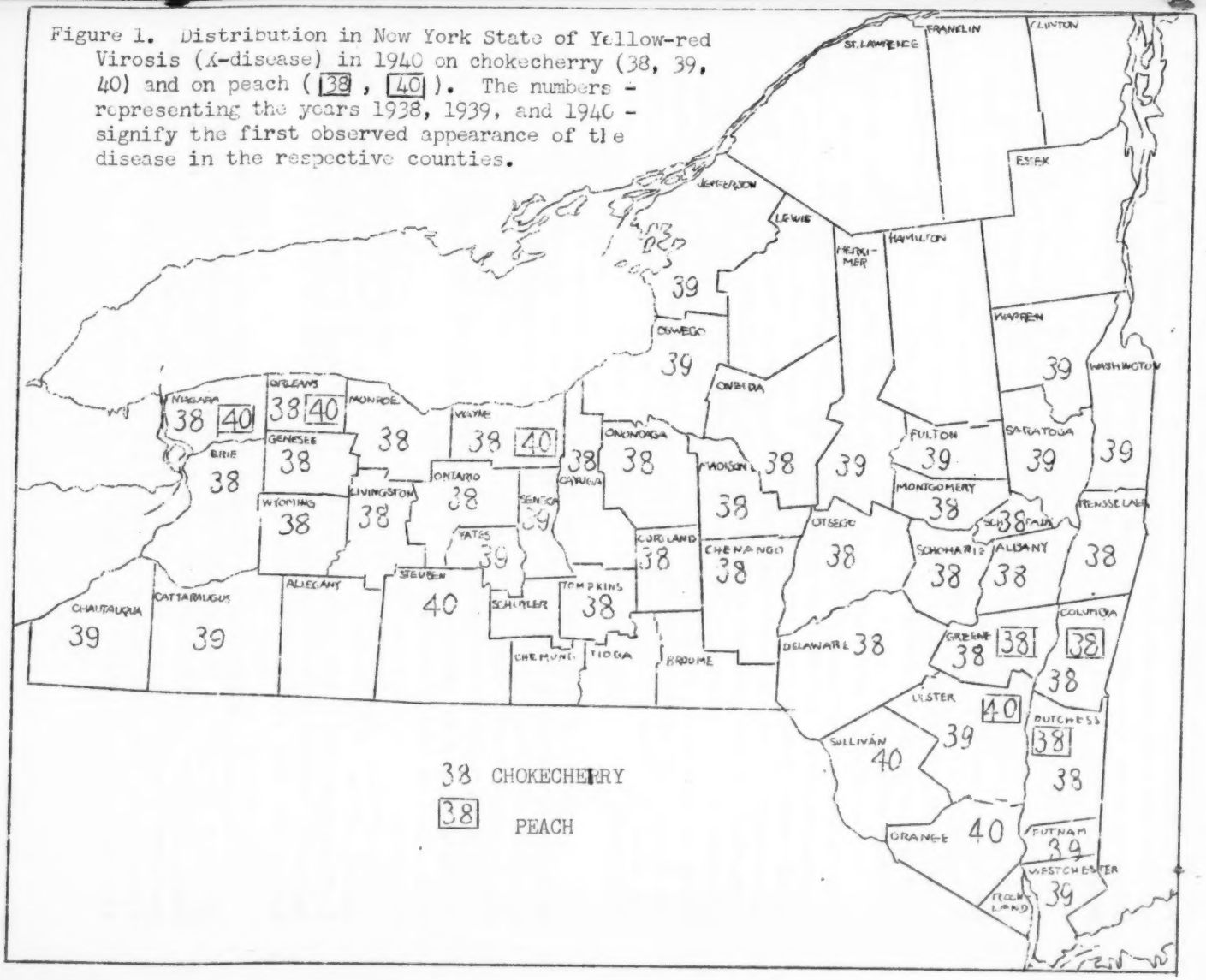
When yellow-red virosis (X-disease) was first reported in New York State in 1938 (Hildebrand and Palmiter, 2; 3), it was already present on peach trees in a few orchards in three Hudson Valley counties and on chokecherries in about 20 counties distributed in a strip about 50 miles wide westward across the state. The distribution of diseased chokecherries was not surveyed in detail at that time but they were fairly obvious and rather prevalent as observed from the highway in parts of the three counties (Columbia, Dutchess, and Greene) where the diseased peaches were found. At that time clumps of diseased chokecherries could be found as close as a few rods apart in Columbia County, for example, while in the western part of the state distances of 10 to 20 miles between diseased plants along the highway were more nearly the rule. This rather marked thinning out of diseased chokecherries as one progressed from east to west together with the fact that the affected plants showed only early stage symptoms in the latter case, was interpreted to mean rapid spread of the virus in a westerly direction. No explanation was given for the apparently slower movement of the disease north and south on the chokecherry.

During the intervening two years the disease has succeeded in invading peach orchards in one additional Hudson Valley county and in three counties of the main peach growing district of western New York along Lake Ontario. Up to the present time the disease has been observed on peach in 7 counties and on chokecherry in 43 counties (Figure 1). The numbers in the several counties (38, 39, and 40) refer to the years 1938, 1939, and 1940 when the disease was first observed in the respective counties on chokecherry (open numbers) and on peach (numbers enclosed in a rectangle). It will be noted from the map that the disease is gradually moving southward and northward.

In addition to the disease becoming more widespread in the state it has become much more abundant in localities previously invaded. Instead of one or a few diseased clumps in a thicket or fence row diseased stretches or strips along fence rows of a quarter mile in length are common in the earlier invaded localities. Such affected areas frequently contain varying amounts of dead or dying chokecherry plants interspersed with variable amounts of plants showing early stage infections and healthy plants which for some reason or other have escaped infection.

Peach orchards first observed diseased in 1939 showed from 20 to 100 percent increase in infected trees in 1940. One orchard with 25 percent of trees infected last year showed 40 percent infection this year or an increase of 60 percent. In another orchard of 475 trees the percentage

Figure 1. Distribution in New York State of Yellow-red Virosis (X-disease) in 1940 on chokecherry (38, 39, 40) and on peach ([38] , [40]). The numbers - representing the years 1938, 1939, and 1940 - signify the first observed appearance of the disease in the respective counties.



of infected trees jumped from 33 to 72 percent. Trees showing the disease for the second year produced practically no fruit. Orchards in which the disease has been present for three years and where no steps have been taken to check its advance are now practically 100 percent infected and produced little or no fruit. Such orchards are being removed.

While no attempt was made to completely survey individual counties the disease was brought to our attention in 1940 in Columbia County in at least six peach orchards in which it had not been reported before. In two of the smaller orchards the disease had already infected from 50 to 85 percent of the trees. In two 30-acre orchards only scattered trees were found infected. Similarly the disease was found in three or more additional orchards in Dutchess County this year and in four new locations in Green County.

The disease was found on peach for the first time in 1940 in Ulster, Niagara, Orleans, and Wayne Counties in, respectively, 2, 6, 2, and 1 orchards where infected chokecherries were first observed in the vicinity of peach orchards the previous year. Diseased chokecherries were found in or near all of the above orchards as has always been the case in observations in the eastern states. Many peach orchards which did not show symptoms of the disease this year are menaced by the presence of diseased chokecherries near by, so it is only a matter of time until they too become infected unless the owners take the necessary steps to remove the chokecherries to a safe distance (500 feet, the minimum recommended distance).

During the past summer many peach growers became concerned about what they considered might be this disease in their orchards. Examinations revealed that in many cases the reddening and spotting of the leaves was due to other causes such as winter or drouth injury to the roots and brown rot cankers which were causing the leaves to turn yellow. In other cases spotting caused by arsenical, zinc or copper injury was found to be the real cause of the trouble.

Growers who have seen infected orchards now realize the serious nature of the disease and many are taking steps to remove the source of infection from their own orchards by the removal of hedgerows and thickets where the chokecherry is found, either by thorough cultivation or spraying the plants with sodium chlorate.

Thorough applications of sodium chlorate at 3/4 pound per gallon of water sprayed on the chokecherry in July resulted in a high degree of kill. Similar applications in September did not give as good results and the surviving plants had to be resprayed the following year. Other herbicides tested have not proved satisfactory as they were either more expensive or not as effective in killing the chokecherry.

As to the relation between this disease and similar troubles in the Midwest (Seifert and Anderson, 4) and in the Pacific Northwest (Blodgett, 1) while the final answer is not yet available, it is strongly suspected that the same virus, or strains of the same virus, is involved. Specimens of chokecherry have been received from Wisconsin, Illinois [Prunus virginiana], and from Utah, Idaho, and Oregon [P. demissa] and of peach from Colorado, Utah, Idaho, Oregon, and California which simulate the symptoms found in the eastern states. The fact that the leaf-casting yellows of peach in California (Thomas, et al., 5) is now believed to be caused by the cherry buckskin virus may provide a clue as to the origin of the disease.

During the past summer the senior author personally observed diseased chokecherry plants in central Wisconsin and in northern Illinois which had symptoms identical to those found in the eastern states. The symptoms observed on both chokecherries and peaches in Utah were also very similar to the eastern material and it is postulated that climatic factors may account for the local variations such as the greater distances that the disease is able to move from chokecherry to peach under Utah conditions. However, work now under way in the several sections of the United States where this new disease is found should soon clarify the problem.

Literature Cited

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2. Hildebrand, E. M. and D. H. Palmiter, The X-virus disease on peaches in New York. Plant Disease Reporter 22:268. 1938.

3. _____ Yellow red virosis (X-disease) of peach and chokecherry. Plant Disease Reporter 22(20):394-496. 1938.

4. Seifert, H. F. and H. W. Anderson. Yellow-red virosis in chokecherry in Illinois, Plant Disease Reporter 23:328. 1939.

5. Thomas, H. Earl, T. E. Rawlins, and K. G. Parker, A transmissible leaf-casting yellows of peach. Phytopath. 30:322-328. 1940.

(Department of Plant Pathology, New York (Cornell University) Agricultural Experiment Station, and Division of Plant Pathology, New York (Geneva) Agricultural Experiment Station).

VIRUS DISEASE OF PEACHES SPREADING IN UTAH

B. L. Richards

The peach virus disease, or so-called X-disease, was first observed in Utah on chokecherry in 1937, and on peach in Box Elder County in July, 1939. Subsequent preliminary surveys during August 1939 showed the disease to be generally distributed in high percentages throughout Box Elder, Weber and Davis Counties. During 1940 Salt Lake and Cache Counties were added to the territory of known distribution. Insofar as we are now informed, Utah County and the southern peach areas of the state are free of the disease, but spread to these areas may be imminent and may take place at any time, if, indeed, it has not already done so.

The alarming extent to which the disease occurs in the area is shown from the fact that of 20 orchards visited in Davis County during the survey of 1939, only two orchards older than four years were found to be disease free. The average incidence of infection for the 20 orchards amounted to 23 percent of the trees planted. In five of these diseased orchards, more than 40 percent of the trees were infected, and in one of the latter, a six-year-old orchard, 68 percent of the trees were diseased. The disease was so severe in this particular orchard that all of the trees were pulled out and destroyed. In 1940, orchards have been fouud in which as high as 75 percent of the trees are diseased, and now other growers are considering elimination of their plantings.

Fruits from infected trees or infected portions of diseased trees are undersized, misshapen, bitter in taste, ripen early and drop from the tree. It is interesting to note that trees once infected do not recover, neither are they completely killed by the disease, but live on and constitute reservoirs of the infectious virus that threaten neighboring trees and finally the entire orchard.

The exact cause of this new peach disease was not known prior to 1940. Experimental studies in Bountiful this year, however, have yielded results and it can now definitely be announced that this malady is transmissible.

(From Utah Agricultural Experiment Station, Farm and Home Science 1(4): 1, 11, December 1940.)

APPLE TREE ANTHRACNOSE IN ILLINOIS

H. W. Anderson

In October, some apples were sent to our laboratory for the identification of a disease which proved to be an unusual type of common scab. These apples were left in the original container for ten days or two weeks. In discarding them, one was found with a rot, closely resembling bitter rot. Since the apples were from Jo Daviess County in the extreme northwest portion of the state where bitter rot is seldom found, a microscopic examination of the spores was made. These were found to be typical of Neofabraea malicorticis (also of Gloeosporium (Neofabraea) perennans). Isolations and inoculation proved the earlier identification. It has not been possible, to date, to visit the orchard for an examination of the trees for cankers. The report of Northwestern apple tree anthracnose in Maine (Plant Disease Reporter 22:354, 1938) is of interest in indicating that this disease may be more generally distributed in the northern apple growing region than has been suspected. The variety on which the rot occurred was supposed by the grower to be Winter Banana, but the fruit was not typical of this variety and was probably a seedling of unknown origin. The trees in this orchard had been obtained from a Missouri nursery and none had come from the Northwest.

(University of Illinois.)

TOMATO DEFOLIATION DISEASES

C. F. Andrus

The recent note by Heuberger, Horsfall, and McDonnell (Plant Disease Reporter 24:429-430), commenting on the rapid action of the early blight organism in causing defoliation of tomatoes in Connecticut, is quite in line with observations on tomato leaf spot made by the writer in South Carolina. In the past two years Stemphylium solani (grey leaf spot of Weber) has been of about equal importance with Macrosporium [Alternaria] solani (early blight) as a cause of defoliation in coastal South Carolina. The two organisms are closely related. One of the principal differences in their behavior lies in the tendency of the Stemphylium to attack the younger peripheral leaves whereas the early blight fungus develops principally on older and usually basal leaves. Artificial inoculations, however, have shown that the two organisms are equally capable of attacking young leaves. Also they are alike in the almost explosive rapidity with which they can cause defoliation of tomato plants. Complete debility of foliage has been obtained within 48 hours after inoculation with each organism.

Stemphylium solani, originally found only in Florida, apparently has not been reported outside of that State except by the writer in South Carolina in 1939. It was first observed here in 1938, increased in abundance in 1939, and caused devastation of tomato foliage in 1940. It is possible that the organism has now spread further north. Septoria [lycopersici] has not been observed on tomatoes in the Charleston area during the past three years.

(Division of Fruit and Vegetable Crops and Diseases.)

POTATO LATE BLIGHT SITUATION IN VIRGINIA IN 1940

Harold T. Cook

Late blight [Phytophthora infestans] was of minor importance in Virginia in the 1940 spring crop. A few potatoes affected with late blight were detected at the grading platforms in late June and early July, but no blight was observed on the foliage except for two fields in low ground about the second week in July. The disease appeared rather suddenly in these two fields and the fungus fruited so heavily on the foliage that it could be detected from a distance. The tops were practically destroyed in these fields but the yield was not reduced since the disease did not occur until the crop was ready to be harvested.

The usual amount of late blight occurred in the fall crop. It was first observed on the Eastern Shore on October 11, but did not cut the yield much in that locality as the tops were killed by frost about ten days later. It was observed in the Norfolk area from the middle of October until about the middle of November when all of the tops finally died. The disease behaved differently this year in that it spread more slowly and did not kill the tops as rapidly and completely as it usually does.

(Virginia Truck Experiment Station, Norfolk.)

BLEEDING CANKER OF MAPLE IN NEW JERSEY

P. P. Pirone

Dr. F. L. Howard of the Rhode Island Experiment Station was the first to call attention to a new disease of maples which he tentatively named maple blight (Phytopath. 29: 11, 1939). The following year he presented further observations on this disease and named it "bleeding canker" in reference to its most characteristic primary symptom, the oozing of sap from fissures overlying cankers in the bark (Phytopath. 30: 11, 1940). He found the disease on several species of maples in home grounds,

parkways, and nurseries in Rhode Island. Dr. Howard discovered the same disease on two large American beeches at Newport, Rhode Island in December, 1939 and on an American beech at Marblehead, Massachusetts in March, 1940 (Plant Disease Reporter 24 (7): 149, 1940).

First Case in New Jersey

The first confirmed case of the bleeding canker disease outside of the New England States was found by the author on a 25-year-old Norway maple on a private estate at Bernardsville, New Jersey in late October. The most striking symptom was the pinkish ooze which emanated from approximately 20 bark fissures scattered around the base of the affected tree. No pronounced canker was visible but the inner bark was reddish-brown and appeared watersoaked when cut. The sapwood underlying the affected area was reddish-brown with a deep olive green margin. The discoloration extended to a depth of several annual rings.

Samples of discolored bark and sapwood were collected and brought to the laboratory. Tissue planting isolations from this material yielded a species of Phytophthora which resembled closely an isolate obtained by Dr. Howard from Rhode Island maples. Dr. C. M. Tucker of the Missouri Agricultural Experiment Station identified the New Jersey isolates as typical cultures of P. cactorum.

The discovery of this diseased tree extends the known geographic range of this destructive vascular and bark disease considerably inasmuch as it has previously been described only from the New England States.

Several Norway maples of the same age in the vicinity of the confirmed case have died and four others show weak vegetative growth. Extensive decay of the main roots and the trunk base was visible on these trees but no bleeding was observed where the bark was still intact. Typical shoestrings and fan-shaped wefts of mycelium of the fungus Armillaria mellea were clearly visible beneath the decayed bark near the soil line on all the trees. No attempt has yet been made to determine whether the bleeding canker fungus was also present in any of these trees. Because of the proximity of these trees to the confirmed case of bleeding canker, it is possible that they may have been first attacked by P. cactorum and then by the shoestring fungus.

In addition to attacking maples and the American beech, P. cactorum causes the crown canker disease of dogwood and the tip blight disease of rhododendrons and is known to attack a number of other hosts.

How Can Bleeding Canker Be Distinguished from Basal Canker?

Bleeding canker should not be confused with the socalled basal canker of Norway maples first reported by the author (Pirone, P. P., Phytopath. 30: 19, 1940). The latter disease is caused by a closely

related though distinctly different fungus known as Phytophthora cambivora. During 1938 and 1939 an estimated 200 Norway maples died as a result of attack by P. cambivora.

Aside from the different causal fungi, the two diseases can be distinguished in the field rather easily. Basal canker appears only on the trunk at or below the soil line where the inner bark, cambium and sapwood are reddish-brown. The discoloration of the sapwood occurs mainly on the surface just below the bark whereas P. cactorum may penetrate into the sapwood to as many as three or four annual rings. The pink ooze exuding from the bark fissures has never been observed on trees affected by P. cambivora but appears to be the most striking symptom on trees affected by P. cactorum. Besides appearing in the deeper layer of wood, the olive green discoloration is always more intense in trees affected by P. cactorum.

Death of trees affected by the basal canker disease (P. cambivora) occurs when the bark around the trunk base is completely girdled.

Control of Phytophthora Diseases of Maple

No effective control measures for the basal canker disease (P. cambivora) are known. Diseased trees should be removed and burned. New plantings of Norway maples should be made in well-drained soils which are high in organic matter. Frost cracks and mechanical injuries near the base of the trunk should be properly treated and dressed and the trees fertilized and watered to maintain good vigor.

As with basal canker, no effective control measures are known for bleeding canker. Some preliminary work by Dr. Howard and Mr. N. Caroselli suggests that the causal fungus (P. cactorum) can be destroyed by injecting certain organic dyes into the trunk. This work is being continued by Mr. Caroselli, and although still in the preliminary stages, appears to offer considerable promise. Definite recommendations cannot be made, however, until further tests have been conducted.

(From New Jersey Agricultural Experiment Station Department of Plant Pathology Nursery Disease Notes 13 (4): 12-16. Oct. 1940.)

RELATIVE SUSCEPTIBILITY OF ROSE VARIETIES TO BLACK SPOT

E. A. Piester

Following is a list of roses, fairly commonly grown, and their resistance to black spot [Diplocarpon rosae] as I have observed it here

and elsewhere over a period of several years. Comments are invited.

I. Foliage Clean or Nearly Free From Black Spot:

Donald Prior
Henry Nevard
Lady Ursula
Miss America
Mrs. Charles Bell
Mrs. Wakefield Christie-Miller
Pink Dawn
Susan Louise--entirely free of black spot.

II. Occasional Traces of Black Spot:

Adoration
Barcelona
California
Charles K. Douglas
Chattilon Rose
Clio
Dream Parade
Duchess of Sutherland
Duchess of Wellington
Etoile de Hollande
Faust
Feu Pernet-Ducher
Glorianna
Kaiserin Auguste Viktoria
Königin Carola
Mabelle Stearns
McGredy's Triumph
Mme. Leon Pain
Mrs. Aaron Ward
Mrs. Oakley Fisher
Poinsettia
Prince Felix (de Luxembourg)
Queen Mary
Radiance
Red Radiance
Roger Lambelin
Sterling
Warrawee

III. Some Black Spot and a Little Defoliation at Base of Plant but not Seriously Affecting Plant Appearance or Bloom:

Better Times
Betty
Betty Prior
Betty Uprichard
Bosnia Nemcova
Caroline Testout, (Mme.)
Carrilon
Crimson Glory
Dickson's Red
Dr. Kirk
Earl Haig
Eclipse
Edel
Editor McFarland
Else Poulsen
Gaiety
Gloaming
Golden Dawn
Golden Frills
Gruss an Aachen
Hector Deane
Holstein
Hortulanus Budde
Impress [?Empress]
Killarney Queen
Lady Pirrie
Little Beauty
Lucy Nicolas
Mme. Abel Chatenay
Mme. Henri Guillot
Mrs. Chas. Mallerin
Mrs. Sam McGredy
Narcisse
President Herbert Hoover
President Macia
Queensland Beauty
Robin Hood
Rochester
Rouge Mallerin
Sensation
Sentinel
Sir Henry Segrave
Soeur Therese
Stratford
Will Rogers
Worlds Fair
Yosemite

IV. Very Susceptible to Black Spot: Defoliation Seriously Affecting Appearance Especially, Although New Growth Helps Keep Top of Plant Looking Well:

Abol
Alezane
Ami Quinard
Caroline Testout,(Mme.)
Christopher Stone
Condesa de Sastago
Dickson's Centennial
Double White Killarney

Duguesa du Penaranda
E. G. Hill
Edith Nellie Perkins
Grenoble
Gruss an Teplitz
Joanna Hill
La France
Lady Alice Stanley
Lady Ashtown
Lady Margaret Stewart
Luis Brinas
McGredy's Pink
McGredy's Sunset
Mme. Jules Bouche
Old Gold
Ophelia
Orange Nassau
Pearl Buck
Radio
Rosalind
Rose Marie
Souvenir de Mme. C. Chambard
Sunshine
Victoria Harrington
Vierlander
Ville de Paris
White Ensign

V. Much Defoliation Greatly Affecting Appearance of Plants, As Well As Late Summer and Fall Bloom:

Angels Mateu
Alice Stern
Antoine Rivoire
Autumn
Caledonia
Condesa de Sastago
Countess Vandal
Dame Edith Helen
Daybreak
Elsie Beckwith
General MacArthur
Hofgärtner Kalb
Jean Cote
Jonkheer F. L. Mock
Margaret McGredy
Max Krause
Mme. Jos. Perraud
Mme. Henry Guillot
Mrs. Erskine Pembroke
Thom
Mrs. Henry Morse
Mrs. Pierre S. DuPont
Nellie E. Hillock
Richmond
Rome Glory
Rosalind
Signora
Smiles
Temno

VI. Very Badly Affected And Defoliated:

Alice Harding
Brazier
Cathrine Kordes
Essence
Feu Joseph Looymans
Golden Main [Goldenes Mainz]
Golden Rapture
Heinrich Wendland
Katherine Pectold
La Parisienne
Lolita Armour
Margaret Anne Baxter
Mme. Edouard Herriot
Mrs. Francis King
Orange Glory
Padre
President Plumecocq
Ronsard
Souvenir de Claudius Pernet
Talisman
Willowmere
Wilhelm Kordes

(From New England Rose Society News Letter, No. 6, November, 1940)

GRASS DISEASES IN THE PACIFIC NORTHWEST IN 1940

George W. Fischer, Associate Pathologist, Division of Forage Crops and Diseases, Bureau of Plant Industry, U. S. Department of Agriculture[1]

In 1940 the writer[2] reported on the grass diseases found in the observational row nurseries of the Pullman, Washington Nursery Unit of the Soil Conservation Nurseries. The present report, while based principally on the diseases occurring in the same nurseries in 1940, has been enlarged to include all grass diseases collected or observed elsewhere in the Pacific Northwest during the 1940 season. Of the latter, most were collected or observed in the State of Washington, although Idaho, Oregon, and Utah are also represented. A few specimens have been sent in from California and Nevada. Forty-four diseases on 130 species of grasses are reported, including 9 leaf-spots, 15 smuts, and 14 rusts.

Weather conditions during the spring and early summer, following close upon the second successive very mild winter, were favorable to the development and spread of foliage diseases, and resulted in unusually heavy rust infestations. Stripe rust (Puccinia glumarum), and leaf rust of bluegrasses (P. poae-sudeticae) reached epiphytotic development early in the year. Stem rust (P. graminis) and to a lesser extent leaf rust (P. rubigo-vera) became especially severe during late summer and early fall on certain Agropyron, Elymus, and Poa spp. Other grass diseases also showed a decided increase in 1940 over 1939. In fact all of the principal diseases were more in evidence in 1940 than in 1939 except head smut (Ustilago bullata), and powdery mildew (Erysiphe graminis).

Along with the epiphytotic development of the leaf rust of bluegrasses came a similar development of the rust parasite, Darluca filum. It is interesting to note that the parasite accompanied the rust only on certain hosts. On others, bearing the same rust, and apparently just as susceptible, no trace of the parasite could be found. The significance of these observations is being investigated.

The writer acknowledges the very able assistance of Mr. John R. Hardison in the taking of the disease notes in the observational row nurseries

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[1]Grass disease investigations of the Division of Forage Crops and Diseases, Bureau of Plant Industry, U. S. Department of Agriculture, in cooperation with the Soil Conservation Service, Division of Conservation Nurseries, U. S. Department of Agriculture, and the Divisions of Plant Pathology and Agronomy of the Washington Agricultural Experiment Station, Pullman, Washington. Published as scientific paper, No. 473, College of Agriculture and Agricultural Experiment Station, The State College of Washington.

[2]Fischer, George W. Grass diseases occurring in the Pullman Nursery Unit of the Soil Conservation Nurseries, Pullman, Wash., during 1939. Plant Disease Reporter, 24: 108-114. 1940.

of the Pullman Unit of the Soil Conservation Service, and the contribution made by Mr. John L. Schwendiman in checking the grass nomenclature in the disease notes for errors. Thanks are due also to Dr. D. C. Smith, the entire field personnel of the Pullman Nursery Unit of the Soil Conservation Service, and others who have collected and submitted grass diseases, and to Dr. Roderick Sprague and Dr. George Cummins for identification of certain leafspot and rust fungi, respectively.

HOST INDEX

Andropogon hallii

Hairpin disease, Cause undetermined,[3] SCS[4]

Agropyron caninum

Hairpin disease, Cause undetermined, BPI Nurs., Pullman, Wash.[5]

Agropyron cristatum

Hairpin disease, Cause undetermined, SCS
Mildew, Erysiphe graminis, SCS
Stem smut, Ustilago hypodytes, SCS, BPI and east. Wash., Ore.
Stripe rust, Puccinia glumarum, SCS

Agropyron dasystachyum

Head smut, Ustilago bullata, SCS
Leaf rust, Puccinia rubigo-vera, SCS, and east. Wash.

Agropyron dasystachyum-continued

Stem rust, Puccinia graminis, SCS
Stripe rust, Puccinia glumarum, SCS, and east. Wash.

Agropyron desertorum

Stripe rust, Puccinia glumarum, SCS

Agropyron elongatum

Stem smut, Ustilago hypodytes, SCS

Agropyron glaucum

Stripe rust, Puccinia glumarum, SCS

Agropyron griffithsii

Hairpin disease, Cause undetermined, SCS
Stripe rust, Puccinia glumarum, SCS

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[3] Under investigation. See Plant Disease Reporter 24: 109. 1940

[4] Observational row nurseries or seed increase plots of the Soil Conservation Service, Pullman, Washington.

[5] Bureau of Plant Industry grass-breeding nursery, Pullman, Washington.

Agropyron inerme

Hairpin disease, Cause undetermined, SCS
Leaf rust, Puccinia rubigo-vera, SCS
Leaf spot, Cause undetermined,[6] SCS
Mildew, Erysiphe graminis, SCS
Stem blotch, Cause undetermined, SCS
Stem rust, Puccinia graminis, SCS
Stem smut, Ustilago hypodytes, SCS
Stripe rust, Puccinia glumarum, SCS
Stripe smut, Ustilago macrospora, north. Utah
Stripe smut, Ustilago striaeformis, east. Wash.

Agropyron intermedium

Stripe rust, Puccinia glumarum, SCS

Agropyron orientale var. lasianthum

Stripe rust, Puccinia glumarum, SCS

Agropyron pauciflorum

Brown stripe rust, Puccinia montanensis, east. Ore.
Head smut, Ustilago bullata, SCS, Union, Ore.
Leaf rust, Puccinia rubigo-vera, east. Wash.
Stem smut, Ustilago hypodytes, SCS, BPI
Stripe rust, Puccinia glumarum, SCS
Stripe smut, Urocystis agropyri, north. Utah

Agropyron pauciflorum, cont.

Stripe smut, Ustilago striaeformis, SCS, north. Ore., north. Utah

Agropyron repens

Stem smut, Ustilago hypodytes, east. Wash., and adj. Idaho
Stripe rust, Puccinia glumarum, SCS

Agropyron saxicola

Stripe rust, Puccinia glumarum, SCS

Agropyron sibiricum

Hairpin disease, Cause undetermined, SCS
Leaf spot, Cause undetermined, SCS
Mildew, Erysiphe graminis, SCS
Stripe rust, Puccinia glumarum, SCS

Agropyron smithii

Stripe rust, Puccinia glumarum, SCS

Agropyron spicatum

Cat-tail disease, Epichloe typhina, Pullman, Wash.
Hairpin disease, Cause undetermined, SCS
Head smut, Ustilago bullata, SCS
Leaf rust, Puccinia pattersoniana, SCS
Leaf rust, Puccinia rubigo-vera, SCS
Mildew, Erysiphe graminis, SCS
Stem blotch, Cause undetermined, SCS

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[6]Many leaf spots have been encountered which failed to show any sign of a causal organism. Some of these are probably genetic or physiologic, while not a few are suspected of being the hypersensitive reactions of resistant accessions to the common rusts.

Agropyron spicatum, cont.

Stem smut, Ustilago hypodytes, SCS
Stripe rust, Puccinia glumarum, SCS
Stripe rust, Puccinia graminis, SCS
Stripe smut, Urocystis agropyri, north. Utah, north. Ore.

Agropyron subsecundum

Hairpin disease, Cause undetermined, SCS
Leaf rust, Puccinia rubigo-vera, SCS
Stem rust, Puccinia graminis, SCS
Stripe rust, Puccinia glumarum, SCS

Agropyron trichophorum

Stem smut, Ustilago hypodytes, BPI

Agropyron uganicum

Stripe rust, Puccinia glumarum, SCS

Agropyron violaceum

Stripe rust, Puccinia glumarum, SCS

Agrostis alba

Leaf spot, Scolecotrichum graminis, SCS
Stripe smut, Ustilago striaeformis, SCS, and east. Wash., north. Ore., north. Utah

Agrostis stolonifera

Stripe smut, Ustilago striaeformis, SCS

Alopecurus pratensis

Leaf spot, Cause undetermined, SCS
Stem rust, Puccinia graminis, SCS

Arrhenatherum elatius

Leaf spot, Scolecotrichum graminis, SCS
Loose smut, Ustilago perennans, SCS, BPI, and east. Wash.

Bromus anomalus

Head smut, Ustilago bullata, SCS
Stripe rust, Puccinia glumarum, SCS

Bromus arvensis

Leaf spot, Selenophoma bromigena, SCS

Bromus brizaeformis

Bunt, Tilletia guyotiana, east. Wash.

Bromus carinatus

Leaf rust, Puccinia rubigo-vera, SCS
Mildew, Erysiphe graminis, SCS and east. Wash.
Stripe rust, Puccinia glumarum, SCS

Bromus catharticus

Leaf rust, Puccinia rubigo-vera, SCS

Bromus erectus

Head smut, Ustilago bullata, SCS
Leaf spot, Cause undetermined, SCS

Bromus inermis

Hairpin disease, Cause undetermined, SCS
Leaf spot, Selenophoma bromigena, SCS

Bromus japonicus

Bunt, Tilletia guyotiana, east. Wash.

Bromus marginatus

Hairpin disease, Cause undetermined, SCS, and east. Wash.

Bromus marginatus, [illegible]

Head smut, Ustilago bullata, SCS, and Wash., Ore., Idaho, Utah
Leaf rust, Puccinia rubigo-vera, east. Wash.
Leaf spot, Scolecotrichum graminis, SCS
Leaf spot, Selenophoma bromigena, SCS
Mildew, Erysiphe graminis, SCS, and east. Wash.
Stem rust, Puccinia graminis, SCS
Stripe rust, Puccinia glumarum, SCS

Bromus mollis

Bunt, Tilletia guyotiana, east. Wash., and north. Ore.
Head smut, Ustilago bullata, east. Wash., Ore.

Bromus polyanthus

Head smut, Ustilago bullata, SCS
Leaf rust, Puccinia rubigo-vera, SCS

Bromus purgans

Head smut, Ustilago bullata, SCS

Bromus secalinus

Hairpin disease, Cause undetermined, Pullman, Wash.

Bromus sterilis

Head smut, Ustilago bullata, Pullman, Wash.

Bromus suksdorfii

Leaf rust, Puccinia rubigo-vera, SCS
Stripe rust, Puccinia glumarum, SCS

Bromus tectorum

Hairpin disease, Cause undetermined, Pullman, Wash.

Head smut, Ustilago bullata, central and east. Wash., and adj. Idaho, Ore., Utah

Bromus tomentellus

Head smut, Ustilago bullata, Pullman, Wash.
Leaf spot, Cause undetermined, SCS

Bromus vulgaris

Hairpin disease, Cause undetermined, SCS

Chloris verticellata

Stripe rust, Puccinia glumarum, SCS

Cynodon dactylon

Smut, Ustilago cynodontis, Calif.

Dactylis glomerata

Hairpin disease, Cause undetermined, SCS, also Salt Lake City, Utah
Leaf spot, Scolecotrichum graminis, SCS
Stem rust, Puccinia graminis, Pullman, Wash.

Deschampsia caespitosa

Crown rust, Puccinia coronata, SCS
Leaf spot, Scolecotrichum graminis, SCS
Stem rust, Puccinia graminis, SCS

Deschampsia danthonioides

Bunt, Tilletia airae, east. Wash., north. Ore.

Deschampsia elongata

Stem rust, Puccinia graminis, SCS

Distichlis stricta

Char spot, Dothidella aristidae, central and east. Wash., north. Ore.

Hairpin disease, Cause undetermined, central Wash.

Leaf spot, Macrosporium sp., east. Wash.
Rust, Puccinia aristidae, central and east. Wash., north. Ore., north. Utah

Distichlis stricta, continued

Stem smut, Ustilago hypodytes, central and east. Wash., and north. Utah

Echinochloa crus-galli

Node smut, Ustilago crus-galli, Nevada

Elymus ambiguus

Stripe rust, Puccinia glumarum, SCS

Elymus angustus

Stem smut, Ustilago hypodytes, SCS

Elymus arenarius

Leaf spot, Cause undetermined, SCS
Stripe rust, Puccinia glumarum, SCS

Elymus arenicola

Stripe rust, Puccinia glumarum, SCS

Elymus canadensis

Cat-tail, Epichloe typhina, SCS
Head smut, Ustilago bullata, SCS
Head smut, Ustilago hordei, BPI
Leaf spot, Cause undetermined, SCS
Leaf spot, Scolecotrichum graminis, SCS
Stem smut, Ustilago hypodytes, SCS
Stripe rust, Puccinia glumarum, SCS

Elymus canadensis, continued

Stripe smut, Urocystis agropyri, Logan, Utah
Stripe smut, Ustilago macrospora, SCS, and north. Utah
Stripe smut, Ustilago striaeformis, SCS

Elymus caput-medusae

Stripe rust, Puccinia glumarum, SCS

Elymus condensatus

Hairpin disease, Cause undetermined, central Wash.
Leaf rust, Puccinia rubigo-vera, east. Wash.
Leaf spot, Cause undetermined, SCS
Leaf spot, Cylindrosporium infuscans, east. Wash.
Mildew, Erysiphe graminis, central and east. Wash.
Stem smut, Ustilago hypodytes, SCS, and east. Wash.
Stripe rust, Puccinia glumarum, SCS
Tar spot, Septogloeum oxysporum, east. Wash.

Elymus giganteus

Leaf spot, Cause undetermined, SCS
Stripe rust, Puccinia glumarum, SCS

Elymus glaucus

Hairpin disease, Cause undetermined, SCS
Head smut, Ustilago bullata, SCS
Leaf rust, Puccinia rubigo-vera, east. Wash.

Elymus glaucus, continued

Leaf spot, Cause undetermined, SCS
Stem rust, Puccinia graminis, SCS
Stem smut, Ustilago hypodytes, SCS
Stripe rust, Puccinia glumarum, SCS
Stripe smut, Urocystis agropyri, Salt Lake City, Utah
Stripe smut, Ustilago striaeformis, SCS, and north. Utah
Tar spot, Septogloeum oxysporum, Logan, Utah

Elymus interruptus

Stripe rust, Puccinia glumarum, SCS

Elymus junceus

Head smut, Ustilago bullata, BPI
Stripe rust, Puccinia glumarum, SCS

Elymus mollis

Leaf rust, Puccinia rubigo-vera, SCS Nurs., Warrenton, Ore.

Elymus sabulosus

Stripe rust, Puccinia glumarum, SCS

Elymus sibiricus

Head smut, Ustilago bullata, SCS

Elymus triticoides

Leaf rust, Puccinia rubigo-vera, SCS, and central and east Wash.
Stripe rust, Puccinia glumarum, SCS

Elymus vancouverensis

Leaf rust, Puccinia rubigo-vera, SCS Nurs., west. Ore.

Elymus virescens

Stripe rust, Puccinia glumarum, SCS

Elymus virginicus

Stripe rust, Puccinia glumarum, SCS

Eragostis lugens

Hairpin disease, Cause undetermined, SCS

Festuca elatior

Leaf blight, Cause undetermined, SCS
Stem rust, Puccinia graminis, SCS

Festuca elatior var. arundinacea

Stem rust, Puccinia graminis, SCS

Festuca idahoensis

Hairpin disease, Cause undetermined, SCS
Leaf rust, Puccinia crandallii, with parasite, Darluca filum, SCS
Mildew, Erysiphe graminis, SCS
Stem rust, Puccinia graminis, SCS

Festuca octoflora

Bunt, Tilletia fusca, central and east. Wash.

Festuca ovina

Leaf rust, Puccinia crandallii, SCS

Festuca ovina var. sulcata

Leaf rust, Puccinia crandallii, SCS

Festuca pacifica

Bunt, Tilletia fusca, central and east. Wash.
Smut, Ustilago mulfordiana, central Wash.

Festuca rubra

Leaf rust, Puccinia crandallii, SCS
Stem rust, Puccinia graminis, SCS

Festuca scabrella

Leaf rust, Puccinia cockerelliana, SCS

Glyceria elata

Leaf spot, Scolecotrichum graminis, Pullman, Wash.

Glyceria striata

Stripe smut, Ustilago longissima, Logan, Utah

Hordeum brevisubulatum

Stripe rust, Puccinia glumarum, SCS

Hordeum jubatum

Head smut, Ustilago bullata, north. Ore., and Utah
Stripe rust, Puccinia glumarum, SCS

Hordeum murinum

Rust, Puccinia hordei, central Wash.

Hordeum nodosum

Head smut, Ustilago bullata, east. Wash., Ore., north. Utah
Stem smut, Ustilago hypodytes, B. P. I.
Leaf rust, Uromyces jacksonii, SCS
Stripe rust, Puccinia glumarum, SCS

Hyparrhenia hirta

Hairpin disease, Cause undetermined, SCS

Koeleria cristata

Hairpin disease, Cause undetermined, SCS
Leaf rust, Puccinia koeleriae, with parasite, Darluca filum, SCS, BPI
Mildew, Erysiphe graminis, SCS, BPI
Stem rust, Puccinia graminis, SCS
Stripe rust, Puccinia glumarum, SCS

Lolium perenne

Crown rust, Puccinia coronata, SCS

Melica terreyana

Hairpin disease, Cause undetermined, SCS

Muhlenbergia asperifolia

Rust, Puccinia schedonnardi, east. Wash.
Tar spot, Phyllachora graminis, east. Wash., north. Ore.

Muhlenbergia racemosa

Hairpin disease, Cause undetermined, SCS

Muhlenbergia racemosa (continued)

Rust, Puccinia schedonnardi, central Wash.

Oryzopsis bloomeri

Stem smut, Ustilago hypodytes, SCS

Oryzopsis hymenoides

Leaf rust, Puccinia stipae, SCS
Stem smut, Ustilago hypodytes, central Wash.

Phleum boehmeri

Stem rust, Puccinia graminis, SCS

Phleum phleoides

Stem rust, Puccinia graminis, SCS

Phleum pratense

Stem rust, Puccinia graminis, SCS, and east. Wash.
Stripe smut, Ustilago striaeformis, SCS, and east. Wash.

Poa ampla

Ergot, Claviceps purpurea, SCS
Leaf rust, Puccinia poae-sudeticae, SCS, and east. Wash.
Mildew, Erysiphe graminis, SCS
Stem rust, Puccinia graminis, SCS, BPI, and east. Wash.
Stem smut, Ustilago hypodytes, SCS

Poa bulbosa

Leaf rust, Puccinia poae-sudeticae, SCS

Poa canbyi

Leaf rust, Puccinia poae-sudeticae, with parasite, Darluca filum, SCS

Mildew, Erysiphe graminis, SCS
Stem rust, Puccinia graminis, SCS

Poa compressa

Leaf spot, Scolecctrichum graminis, SCS

Poa curta

Leaf rust, Puccinia poae-sudeticae, with parasite, Darluca filum, SCS
Stem rust, Puccinia graminis, SCS

Poa cusickii

Leaf rust, Puccinia poae-sudeticae, with parasite, Darluca filum, SCS

Poa epilis

Stem rust, Puccinia graminis, SCS

Poa gracillima

Leaf rust, Puccinia poae-sudeticae, with parasite, Darluca filum, SCS
Stem rust, Puccinia graminis, SCS

Poa juncifolia

Leaf rust, Puccinia poae-sudeticae, with parasite, Darluca filum, SCS
Stem rust, Puccinia graminis, SCS
Stem smut, Ustilago hypodytes, SCS

Poa macrantha

Stem rust, Puccinia graminis, SCS, Nurs., Warrenton, Ore.

Poa nemoralis

Leaf rust, Puccinia poae-sudeticae, SCS

Poa nervosa

Leaf rust, Puccinia poae-sudeticae, SCS

Poa nevadensis

Ergot, Claviceps purpurea, SCS
Leaf rust, Puccinia poae-sudeticae, with parasite, Darluca filum, SCS
Stem rust, Puccinia graminis, SCS

Poa palustris

Mildew, Erysiphe graminis, SCS
Stem smut, Ustilago hypodytes, SCS

Poa pratensis

Leaf rust, Puccinia poae-sudeticae, SCS, and east. Wash.
Mildew, Erysiphe graminis, east. Wash.
Stripe smut, Urocystis agropyri, east. Wash.
Stripe smut, Ustilago striaeformis, east. Wash., north. Utah.

Poa scabrella

Leaf rust, Puccinia poae-sudeticae, with parasite, Darluca filum, SCS

Poa scabrella, (continued)

Leaf spot, Septoria macropoda, SCS
Mildew, Erysiphe graminis, SCS
Stem rust, Puccinia graminis, SCS

Poa secunda

Leaf rust, Puccinia poae-sudeticae, with parasite, Darluca filum, SCS
Mildew, Erysiphe graminis, SCS
Stem rust, Puccinia graminis, SCS
Twist disease, Dilophospora alopecuri, Logan, Utah

Poa sphondyloides

Leaf rust, Puccinia poae-sudeticae, with parasite, Darluca filum, SCS
Stem rust, Puccinia graminis, SCS

Poa tibetica

Leaf rust, Puccinia poae-sudeticae, SCS
Stem rust, Puccinia graminis, SCS

Poa vaseyochloa

Leaf rust, Puccinia poae-sudeticae, SCS

Polypogon monspeliensis

Mildew, Erysiphe graminis, east. Wash., and north. Utah

Puccinellia distans

Leaf rust, Puccinia rubigo-vera, SCS
Mildew, Erysiphe graminis, SCS
Stem rust, Puccinia graminis, SCS
Stem smut, Ustilago hypodytes, SCS

Puccinellia nutkaensis

Leaf rust, Puccinia rubigo-vera, SCS
Stem rust, Puccinia graminis, SCS

Puccinellia nuttalliana

Leaf rust, Puccinia rubigo-vera, SCS
Stem rust, Puccinia graminis, SCS

Secale cereale x S. montanum

Ergot, Claviceps purpurea, BPI
Hairpin disease, Cause undetermined, BPI
Leaf rust, Puccinia rubigo-vera secalis, BPI

Secale montanum

Leaf rust, Puccinia rubigo-vera secalis, Pullman, Wash.
Stripe rust, Puccinia glumarum, SCS

Setaria lutescens

Smut, Ustilago neglecta, central Wash.

Sitanion hystrix

Stripe rust, Puccinia glumarum, SCS, BPI

Sitanion jubatum

Stem smut, Ustilago hypodytes, SCS
Stripe rust, Puccinia glumarum, SCS

Spartina gracilis

Leaf blight, Ascochyta spartinae[7], Logan, Utah

[7]This identification is questionable, for according to Dr. Roderick Sprague the fungus in question may prove to be a species of Septoria.

Sporobolus asper

Hairpin disease, Cause undetermined, SCS

Stipa comata

Leaf rust, Puccinia stipae, SCS
Stem rust, Puccinia graminis, SCS
Stem smut, Ustilago hypodytes, central Wash.

Stipa thurberiana

Stem smut, Ustilago hypodytes, SCS, east. Wash.

Tricholaena rosea

Leaf spot, Phyllosticta sp., SCS

Trisetum cernuum

Stripe rust, Puccinia glumarum, SCS

Trisetum spicatum

Leaf rust, Puccinia rubigo-vera, SCS

PATHOGENE INDEX

Cause Undetermined

Hairpin disease

Andropogon hallii
Agropyron caninum
Agropyron cristatum
Agropyron griffithsii
Agropyron inerme
Agropyron sibiricum
Agropyron spicatum
Agropyron subsecundum
Bromus inermis
Bromus marginatus
Bromus secalinus
Bromus tectorum
Bromus vulgaris
Dactylis glomerata
Distichlis stricta
Elymus condensatus
Elymus glaucus
Eragrostis lugens
Festuca idahoensis
Hyparrhenia hirta
Koeleria cristata
Melica terreyana
Muhlenbergia racemosa
Secale cereale x S. montanum
Sporobolus asper

Ascomycetes

Claviceps purpurea

Poa ampla
Poa nevadensis
Secale cereale x S. montanum

Dothidella aristidae

Distichlis stricta

Epichloe typhina

Agropyron spicatum
Elymus canadensis

Erysiphe graminis

Agropyron cristatum
Agropyron inerme
Agropyron sibiricum

Erysiphe graminis (cont.)

Agropyron spicatum
Bromus carinatus
Bromus marginatus
Elymus condensatus
Festuca idahoensis
Koeleria cristata
Poa ampla
Poa canbyi

Erysiphe graminis (cont.)
Poa palustris
Poa pratensis
Poa scabrella

Erysiphe graminis (cont)
Poa secunda
Polypogon monspeliensis
Puccinellia distans

Phyllachora graminis
Muhlenbergia asperifolia

Fungi Imperfecti

Ascochyta spartinae

Spartina gracilis

Cylindrosporium infuscans

Elymus condensatus

Darluca filum

Festuca idahoensis (with Puccinia crandallii)
Koeleria cristata (with Puccinia koeleriae)
Poa canbyi (with Puccinia poae-sudeticae)
Poa curta (with Puccinia poae-sudeticae)
Poa cusickii (with Puccinia poae-sudeticae)
Poa gracillima (with Puccinia poae-sudeticae)
Poa juncifolia (with Puccinia poae-sudeticae)
Poa nevadensis (with Puccinia poae-sudeticae)
Poa scabrella (with Puccinia poae-sudeticae)
Poa secunda (with Puccinia poae-sudeticae)
Poa sphondyloides (with Puccinia poae-sudeticae)

Dilophospora alopecuri

Poa secunda

Macrosporium sp.

Distichlis stricta

Phyllosticta sp.

Tricholaena rosea

Scolecotrichum graminis

Agrostis alba
Arrhenatherum elatius
Bromus marginatus
Dactylis glomerata
Deschampsia caespitosa
Elymus canadensis
Glyceria elata
Poa compressa

Selenophoma bromigena

Bromus arvensis
Bromus inermis
Bromus marginatus

Septogloeum oxysporum

Elymus condensatus
Elymus glaucus

Septoria macropoda

Poa scabrella

Ustilaginales

Ustilaginaceae

Ustilago bullata

Agropyron dasystachyum
Agropyron pauciflorum
Agropyron spicatum
Bromus anomalus
Bromus erectus
Bromus marginatus
Bromus mollis
Bromus polyanthus
Bromus purgans
Bromus sterilis
Bromus tectorum
Bromus tomentellus
Elymus canadensis
Elymus glaucus
Elymus junceus
Elymus sibiricus
Hordeum jubatum
Hordeum nodosum

Ustilago crus-galli

Echinochloa crus-galli

Ustilago cynodontis

Cynodon dactylon

Ustilago hordei

Elymus canadensis

Ustilago hypodytes

Agropyron cristatum
Agropyron elongatum
Agropyron inerme
Agropyron pauciflorum
Agropyron repens
Agropyron spicatum
Agropyron trichophorum
Distichlis stricta

Ustilago hypodytes (continued)

Elymus angustus
Elymus canadensis
Elymus condensatus
Elymus glaucus
Hordeum nodorum
Oryzopsis bloomeri
Oryzopsis hymenoides
Poa ampla
Poa juncifolia
Poa palustris
Puccinellia distans
Sitanion jubatum
Stipa comata
Stripe thurberiana

Ustilago longissima

Glyceria striata

Ustilago macrospora

Agropyron inerme
Elymus canadensis

Ustilago mulfordiana

Festuca pacifica

Ustilago neglecta

Setaria lutescens

Ustilago perennans

Arrhenatherum elatius

Ustilago striaeformis

Agropyron inerme
Agropyron pauciflorum
Agrostis alba
Agrostis stolonifera
Elymus canadensis
Elymus glaucus

Ustilago striaeformis

Phleum pratense
Poa pratensis

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Tilletia airae

Deschampsia danthonioides

Tilletia fusca

Festuca octoflora
Festuca pacifica

Tilletia guyotiana

Bromus brizaeformis
Bromus japonicus
Bromus mollis

Urocystis agropyri

Agropyron pauciflorum
Agropyron spicatum
Elymus canadensis
Elymus glaucus
Poa pratensis

Uredinales

Pucciniaceae

Puccinia aristidae

Distichlis stricta

Puccinia cockerelliana

Festuca scabrella

Puccinia coronata

Deschampsia caespitosa
Lolium perenne

Puccinia crandallii

Festuca idahoensis (with parasite, Darluca filum)

Festuca ovina
Festuca ovina var. sulcata
Festuca rubra

Puccinia glumarum

Agropyron cristatum

Puccinia glumarum, (continued)

Agropyron dasystachyum
Agropyron desertorum
Agropyron glaucum
Agropyron griffithsii
Agropyron inerme
Agropyron intermedium
Agropyron orientale var. lasianthum
Agropyron pauciflorum
Agropyron repens
Agropyron saxicola
Agropyron sibiricum
Agropyron smithii
Agropyron spicatum
Agropyron subsecundum
Agropyron uganicum
Agropyron violaceum
Bromus anomalus
Bromus carinatus
Bromus marginatus
Bromus suksdorfii
Chloris verticellata
Elymus ambiguus
Elymus arenarius
Elymus arenicola

Puccinia glumarum, (continued)

Elymus canadensis
Elymus caput-medusae
Elymus condensatus
Elymus giganteus
Elymus glaucus
Elymus interruptus
Elymus junceus
Elymus sabulosus
Elymus triticoides
Elymus virescens
Elymus virginicus
Hordeum brevisubulatum
Hordeum jubatum
Hordeum nodosum
Koeleria cristata
Secale montanum
Sitanion hystrix
Sitanion jubatum
Trisetum cernuum

Puccinia graminis

Agropyron dasystachyum
Agropyron inerme
Agropyron spicatum
Agropyron subsecundum
Alopecurus pratensis
Bromus marginatus
Dactylis glomerata
Deschampsia caespitosa
Deschampsia elongata
Elymus glaucus
Festuca elatior
Festuca elatior var. arundinacea
Festuca idahoensis
Festuca rubra
Koeleria cristata
Phleum boehmeri
Phleum phleoides
Phleum pratense
Poa ampla
Poa canbyi
Poa curta
Poa epilis
Poa gracillima

Puccinia graminis (continued)

Poa juncifolia
Poa macrantha
Poa nevadensis
Poa scabrella
Poa secunda
Poa sphondyloides
Poa tibetica
Puccinellia distans
Puccinellia nutkaensis
Puccinellia nuttalliana
Stipa comata

Puccinia hordei

Hordeum murinum

Puccinia koeleriae

Koeleria cristata (with parasite, D. filum)

Puccinia montanensis

Agropyron pauciflorum

Puccinia pattersoniana

Agropyron spicatum

Puccinia poae-sudeticae

Poa ampla
Poa bulbosa
Poa canbyi, with parasite, Darluca filum
Poa curta, with parasite, Darluca filum
Poa cusickii, with parasite, Darluca filum
Poa gracillima, with parasite, Darluca filum
Poa juncifolia, with parasite, Darluca filum
Poa nemoralis
Poa nervosa
Poa nevadensis, with parasite, Darluca filum

Puccinia poae-sudeticae (continued)

Poa pratensis
Poa scabrella, with parasite, Darluca filum
Poa secunda, with parasite, Darluca filum
Poa sphondyloides, with parasite, Darluca filum
Poa tibetica
Poa vaseyochloa

Puccinia rubigo-vera

Agropyron dasystachyum
Agropyron inerme
Agropyron pauciflorum
Agropyron spicatum
Agropyron subsecundum
Bromus carinatus
Bromus catharticus
Bromus marginatus
Bromus polyanthus
Bromus suksdorfii
Elymus condensatus

Puccinia rubigo-vera (continued)

Elymus glaucus
Elymus mollis
Elymus triticoides
Elymus vancouverensis
Puccinellia distans
Puccinellia nutkaensis
Puccinellia nuttalliana
Secale cereale x S. montanum
Secale montanum
Trisetum spicatum

Puccinia schedonnardi

Muhlenbergia asperifolia

Puccinia stipae

Oryzopsis hymenoides

Uromyces jacksonii

Hordeum nodosum

CHECK LIST REVISION

Freeman Weiss

CASTILLA

CASTILLA (CASTILLOA) ELASTICA Cerv., MEXICAN RUBBER TREE. Tropical America.

Botryodiplodia theobromae Pat. (Diplodia cacaoicola P. Henn., D. rapax Mass.), dieback. West Indies.
Fomes lignosus (Kl.) Bres., heart rot. Tropical America.
Rosellinia bunodes (Berk. & Br.) Sacc., West Indies.
Uredo artocarpi Berk. & Br., rust. West Indies.

CASUARINA

CASUARINA spp., AUSTRALIAN-PINE. Hardwood trees or shrubs of Australia, cult. in Fla. and Calif.

Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.

CATALPA

CATALPA spp., especially C. PIGNONIOIDES Walt., SOUTHERN CATALPA (Growth Regions 22, 25, 27, 28, 29, 30) and C. SPECIOSA Warder, NORTHERN CATALPA (Growth Regions 21, 22, 23, 25, 29), but both spp. cult. beyond this range. C. BUNGEI Meyer and other Asiatic spp. also are cult.

Alternaria catalpae (Ell. & Mart.) Parker,? leaf spot, possibly secondary. Widespread.
Armillaria mellea Vahl ex Fr., mushroom root rot. Wash.
Ascochyta catalpae Tassi (?Phyllosticta catalpae Ell. & Mart.), on leaves. Pa.
Botryosphaeria ribis Gross. & Dug., on branches. Occasional.
Cercospora catalpae Wint., leaf spot. Widespread.
Collybia velutipes Fr., heart rot. Ind.
Corticium solani (Prill. & Del.) Bourd. & Galz. (Rhizoctonia solani Kühn), damping off (seedlings). Nebr.
(Diaporthe catalpae Ell. & Ev.): D. eres Nit., on dead branches. Occasional.
Didymosphaeria catalpae Parker, on leaves. Ohio. (Associated with Phyllosticta catalpae.)
(Diplodia natalensis Pole-Evans): Physalospora rhodina
Gloeosporium catalpae Ell. & Ev., leaf spot. Mass. to Md. and Pa.
Helicobasidium purpureum (Tul.) Pat. (Rhizoctonia crocorum (Pers.) D.C.), root rot (seedlings). Ohio.
Heterodera marioni (Cornu) Goodey, root knot. Southern States to Ohio and Okla.
(Macrosporium catalpae Ell. & Mart.): Alternaria catalpae.
Microsphaera alni DC. ex Wint. (including var. vaccinii = M. elevata Burr.), powdery mildew. Eastern and Central States.
Phyllactinia corylea Pers. ex Karst., powdery mildew. Eastern States to S. Car. and Ill.
Phyllosticta catalpae Ell. & Mart., leaf spot. General. (Associated with Didymosphaeria catalpae, possibly its conidial stage.)
Physalospora obtusa (Schw.) Cke. and P. rhodina (Berk. & Cke.) Cke., on dead branches. Va. and Ala.
Polyporus catalpae Schrenk., brown butt rot. Kans., Mo. (A nomen nudum.)
P. hirsutus Wulf ex Fr., sapwood rot. Ohio.
P. versicolor L. ex Fr., spongy yellow heart rot. General.
Rhabdospora baculum (Ger.) Grove, on dead branches. N.Y.
Schizophyllum commune Fr., sapwood rot. Ohio.
Stereum versicolor Sow. ex Fr., sapwood rot. Ohio.
Thielaviopsis basicola (Berk.) Ferr., seedling root rot. Ohio.
Trametes sepium, Berk., sapwood rot. Kans.

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* Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.

CATALPA--Continued

Verticillum albo-atrum Reinke & Berth., wilt. Ill.
(Wilt of undetermined origin reported from Ind., Ky., Mass., Va.)

CEANOTHUS

CEANOTHUS AMERICANUS L., JERSEY-TEA. Growth Regions 17, 20, 22, 24, 25, 26, 28, 29, 30.

Botryosphaeria ribis Gross. & Dug., on dead stems. Occasional.
Camarosporium ceanothi Dearn., on dead stems. Md. (Probably an imperfect stage of Cucurbitaria.)
Cercospora ceanothi Kell. & Sw., leaf spot. Central States.
Cucurbitaria ceanothi Dearn. & House, on dead stems. N. Y.
Cytospora ceanothi Schw., on twigs. Pa.
Didymella sp. (Diaporthe minuta Dearn. & House), on dead stems. N. Y.
Didymosphaeria housei Dearn., on dead stems. N. Y.
Macrophoma ceanothi Dearn. & House, on dead stems. N. Y.
Microdiplodia ceanothi Dearn. & House, on dead stems. N. Y. (Associated with Didymosphaeria.)
Microsphaera alni DC. ex Wint., powdery mildew. Widespread.
Phyllosticta ceanothi Miles, leaf spot. Miss.
(Physalospora ceanothina (Pk.) Sacc.): P. obtusa (Schw.) Cke., on stems. N. Y.
Rhizobium sp., root nodules (symbiotic). General.
(Sphaeropsis ceanothi Dearn. & House): Physalospora obtusa.
Thyridium ceanothi Dearn. & House, on dead twigs. N. Y.

CEANOTHUS spp. Shrubs or small trees of the Western Plains and Pacific Coast.

Cenangium aureum Ell. & Ev., on dead stems. Colo.
Cercospora ceanothi Kell. & Sw., leaf spot. Kans., Wis.
Cylindrosporium ceanothi Ell. & Ev., leaf spot. Pacific Coast States.
Didymosphaeria ceanothi Cke. & Harkn., on twigs. Calif.
Diplodia ceanothi Ell. & Barth. (?D. mutila (Fr.) Mont.), on stems. Kans.
Dasyscypha succinea (Phill.) Sacc., on dead twigs. Calif.
Harknessia aggregata Syd., on old leaves. Utah.
Leptosphaeria ceanothi (Cke. & Harkn.) Berl. & Vogl., on twigs. Calif.
Physalospora obtusa (Schw.) Cke., on twigs. Occasional.
Phytomonas tumefaciens (EFS.) Bergey, crown gall. Wash.
Puccinia tripsaci Diet. & Holw., rust (O and I). Kans., Nebr., Wis. II and III on Andropogon and Tripsacum spp.
Schizophyllum commune Fr., sapwood rot. Calif.
Septoria ceanothi Dearn., leaf spot. Idaho.
Thyridium tuberculatum Rehm, on dead branches. Calif.

CECROPIA

CECROPIA PELTATA L., TRUMPET TREE (SNAKEWOOD TREE). Tropical America. C. PALMATA Willd. is cult. in Fla.

Anthostomella cecropiae (Rehm) Höhn., on leaves. Canal Zone, P. R.
Fusicladium cecropiae (Stevens) Toro, on leaves. P. R.
Heterodera marioni (Cornu) Goodey, root knot. Fla.

CEDRELA

CEDRELA ODORATA L., WEST-INDIAN or SPANISH CEDAR. Tropical America.

(Dimerosporium urbanianum P. Henn.): Parodiopsis melioloides
Parodiopsis melioloides (Wint.) Maubl., on leaves. P. R.
Phyllachora balansae Speg., seedling blight. P. R.

CEDRELA SINENSIS Juss., CEDRELA. Ornamental tree of China, rarely cult. in N. Y. and S. New England.

Schizophyllum commune Fr., wound rot. N.Y.

CEDRUS

CEDRUS ATLANTICA Manetti, ATLAS CEDAR; C. DEODARA (Roxb.) Loud., DEODAR CEDAR; and C. LIBANI Loud., CEDAR OF LEBANON. Native trees of Mediterranean region and SW. Asia, cult. in warm temperate zones of U. S.

Armillaria mellea Vahl ex Fr., root rot. Miss.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Fomes pini (Brot. ex Fr.) Karst., root rot, heart rot. Occasional.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Sphaeropsis ellisii Sacc., canker, dieback. Ala.

CELASTRUS

CELASTRUS SCANDENS L., CLIMBING or SHRUBBY BITTERSWEET. Eastern U. S. to Great Plains; this and several Asiatic spp. also cult.

Asterina celastri Ell. & Kell., on leaves. Kans., Me., Mich.
Botryodiplodia celastri (Cke.) Sacc., on dead stems. (Numerous fungi occurring on dead stems of bittersweet have been given "host species" names, e. g. the preceding and also Botryosphaeria hibisci (Schw.) Sacc., Diplodia celastrina Ell. & Barth.,

CELASTRUS--Continued

Dothiorella celastri Pk., Haplosporella propullans (Schw.) Petr. & Syd. (Sphaeropsis propullans (Schw.) Pk. and S. celastrina Pk.); possibly all referable to Botryosphaeria ribis Gross. & Dug. or Physalospora obtusa (Schw.) Cke.).
Camarosporium abnormale (Pk.) Sacc., on dead stems. N. Y.
Cercospora melanochaeta Ell. & Ev., leaf spot. Widespread
Coryneum pithoideum Dearn. & House, on dead stems. N. Y.
Cytospora celastri Clements (C. celastrina Ell. & Barth.) on dead stems. Kans., Nebr.
Diaporthe celastrina Ell. & Barth., on dead stems. Kans., Mich., N. Y.
Gloeodes pomigena (Schw.) Colby, on dead stems. Ind.
Glomerella cingulata (Ston.) Spauld. & Schrenk., stem canker. N. H.
Labrella celastri Dearn. & House (?Leptothyrium celastri Berk. & Cke.), on dead stems. N. Y.
Phomopsis pallens (Berk. & Curt.) Grove, on carpels & stems. N. Y.
Physalospora obtusa (Schw.) Cke., on stems. Widespread.
Microthyriella celastri (Ell. & Kell.) Theiss., on leaves. Kans., Me., Mich.
Microsphaera alni DC. ex Wint., powdery mildew. Wis.
Nectria cinnabarina Tode ex Fr., on dead stems. Mich.
Phyllactinia corylea Pers. ex Karst., powdery mildew. General.
Phyllosticta celastri Ell. & Ev., leaf spot. W. Va.
Phytomonas tumefaciens (EFS.) Bergey, crown gall. Conn.
Ramularia celastri Ell. & Mart., leaf spot. General.

CELTIS

CELTIS LAEVIGATA WILLD., SUGARBERRY, SOUTHERN HACKBERRY; including minor CELTIS spp. of the southern U. S. Growth Regions 11, 16, 17, 20, 22, 25, 29, 30.

Cercosporella celtidis (Ell. & Kell.) Davis, leaf spot. Ala. Texas
Cylindrosporium celtidis Earle, leaf spot. Ala.
C. defoliatum Heald & Wolf, leaf blight. Texas.
Didymella celtidis Berk. & Cke., on branches. S. Car.
Fomes geotropus Cke. and F. marmoratus (Berk. & Cke.) Cke., butt rot, heart rot. Southern States.
Ganoderma lucidum (Leyss.) Karst., butt rot. Southern States.
Helicobasidium purpureum (Tul.) Pat. (Rhizoctonia crocorum (Pers.) DC.), seedling blight. Texas.
(Macrosporium antennaeforme Berk. & Cke.): Alternaria, on leaves. Ala.. (Transfer to Alternaria not yet made.)
Phoradendron engelmanni Trel. and P. flavescens (Pursh) Nutt., mistletoe. Southeastern and Gulf States.
Physalospora fusca N. E. Stevens and P. obtusa (Schw.) Cke., on dead branches. Occasional.

CELTIS--Continued

Polyporus spp., including P. adustus Willd. ex Fr., P. cuticularis Bull. ex Fr., P. hirsutus Wulf ex Fr., P. pargamenus Fr., P. robiniophilus (Murr.) Lloyd, P. sulphureus Bull. ex Fr., P. versicolor L. ex Fr., P. zonalis Berk., wood rot, occasionally on living trees. Widespread but reported mostly from Lower Mississippi Valley.
Poria ambigua Bres., root rot. Texas.
Pseudoperonospora celtidis (Waite) Wils., downy mildew. Ga., Md.
(Ramularia celtidis Ell. & Ev.): Cercosporella celtidis.
Septobasidium burtii Lloyd, felt fungus canker. Texas
Stereum fuscum (Schrad.) Quél., wood rot. Cosmopolitan.
Uncinula parvula Cke. & Pk., powdery mildew. Widespread.
U. polychaeta (Berk. & Curt.) Ell., powdery mildew. Southeastern States.

CELTIS OCCIDENTALIS L., HACKBERRY; including minor CELTIS spp. of western and southwestern U. S. Growth Regions 15, 16, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.

Armillaria mellea Vahl ex Fr., mushroom root rot. Occasional.
Camarosporium celtidis Ell. & Ev., on branches. Kans.
Cercosporella celtidis (Ell. & Kell.) Davis, leaf spot. Central States to Texas.
Cucurbitaria celtidis Shear, on dead branches. Kans.
Cylindrosporium defoliatum Heald & Wolf, leaf blight. Texas.
Cytospora celtidis Ell. & Ev., on branches, Kans., W. Va.
Daedalea ambigua Berk., D. confragosa Bolt. ex Fr., D. repanda Pers. ex Fr., D. unicolor Bull. ex Fr., wood rot, occasionally on living trees.
Didymosphaeria celtidis Schw., on dead branches. Kans.
Dinemasporium decipiens (De Not.) Sacc. and D. radiatum Ell. & Ev., on dead twigs. Kans., Pa.
Diplodia celtidigena Ell. & Barth., on dead branches. Kans., Mo.
Dothiorella celtidis Pk., on dead twigs. N. Y.
Eriophyes sp. (gall-mites), witches'-broom. See Sphaerotheca phytoptophylla.
Gloeosporium celtidis Ell. & Ev., on leaves. Nebr.
Haplosporella celtidis Ell. & Ev., on branches. W. Va.
Helicoceras celtidis (Biv.-Bernh.) Linder, on leaves. Ark., Kans., Mo.
Hendersonia celtidis Ell. & Ev., on dead twigs. Pa. Ill., N. J.
H. celtifolia Cke., on leaves.
Macrophoma celtidicola Dearn. & House, Mo., Nebr.
(Macrosporium antennaeforme Berk. & Curt.): Alternaria, on leaves. Mo., W. Va.

CELTIS--Continued

Melanconium celtidis Ell. & Ev., on dead branches. Kans.
Mycosphaerella maculiformis (Pers. ex Fr.) Shroet., on fallen leaves. Kans.
Myxosporium ulmi (Oud.) Sacc., on branches. Texas.
Phleospora celtidis Ell. & Morg., leaf spot. Mass. to Kans. and Mo.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Va. to Mo. and Texas.
Phyllosticta celtidis Ell. & Ev., leaf spot. General.
Phymatotrichum omnivorum (Shear) Dug., root rot. Okla., Texas.
Physalospora obtusa (Schw.) Cke., on dead branches. Occasional.
Placosphaeria celtidis Dearn. & House, on twigs. N. Y.
Pseudoperonospora celtidis (Waite) Wils., downy mildew. Md.
Polyporus spp. Cf. C. laevigata.
Rosellinia caespitosa Ell. & Ev., on dead branches. Kans.
Septobasidium burtii Lloyd, felt fungus canker. Texas.
Septogloeum celtidis Dearn., leaf spot. N. Y.
(Septoria gigaspora Ell. & Ev.): Phleospora celtidis.
Sphaeropsis celtidis Ell. & Ev., on dead branches. Kans.
Sphaerotheca phytoptophyla Kell. & Sw., powdery mildew, witches'-broom. Associated with gall-mites, Eriophyes sp. Central States to Kans.
(Thelephora retiformis Auth.): Septobasidium burtii.
Uncinula parvula Cke. & Pk., powdery mildew. Widespread.
U. polychaeta (Berk. & Cke.) Ell., powdery mildew. Southern States.

(Division of Mycology and Disease Survey).

NOVEMBER WEATHER

(From the U. S. Department of Commerce Weather Bureau Weekly Weather and Crop Bulletin for the week ending December 3.)

The weather of November 1940 was in marked opposition to that of November a year ago. This month last year was abnormally warm over most of the western two-thirds of the country and was one of the driest Novembers of record, while the outstanding characteristics this year were the heavy precipitation in nearly all sections from the Rocky Mountains eastward and markedly subnormal temperatures over most of the West and Northwest.

Figure 1 shows the departure of temperatures from normal which is in almost complete opposition to November a year ago. In the more eastern States the averages this year were slightly below normal, while they were slightly above normal a year ago. In addition, throughout a large northwestern area they were 4° to 10° subnormal this year against 4° to 10° above normal in 1939.

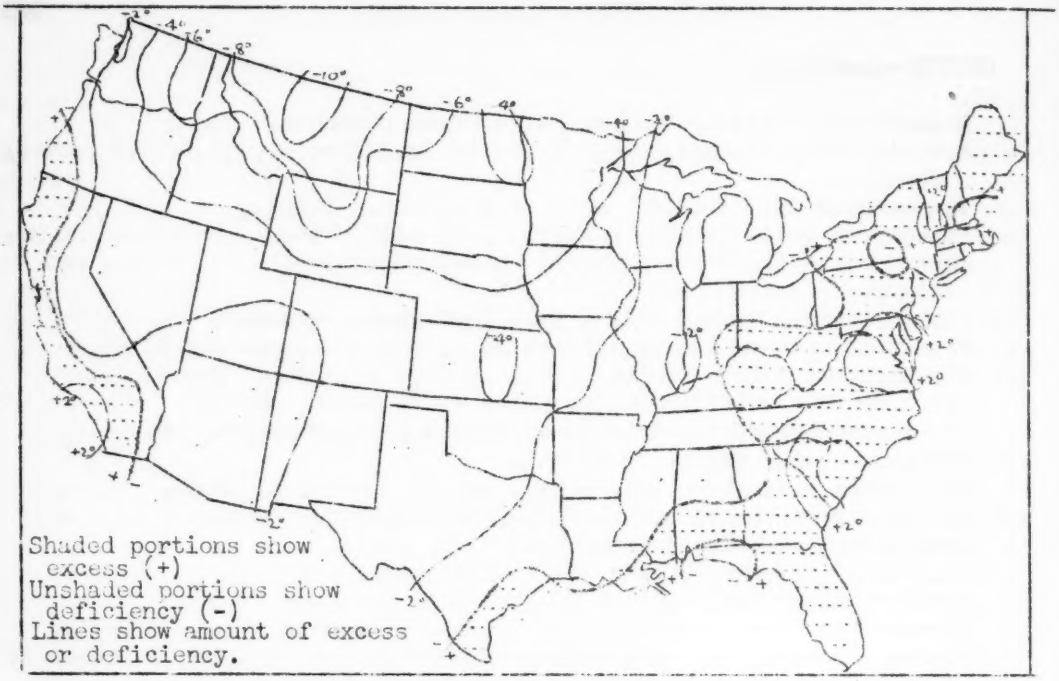

Figure I--Departure of Mean Temperature from Normal for November 1940

Figure II--Percentage of Normal Precipitation for November 1940

Figure 2 shows the percentage of normal precipitation for November 1940. Last November, only one State, Arizona, had as much as normal rainfall, while this year the amounts were heavy to excessive in much of the Great Basin of the West and generally east of the Rocky Mountains, except the extreme Southeast was very dry and a few other local areas, principally the northern Great Plains, had less-than-normal rainfall. A large area from Kansas southward had from 300 to more than 400 percent of normal, except locally in the South, and more than twice the normal occurred in a belt from central Georgia northeastward to eastern Maryland and in some upper Mississippi Valley sections. The extreme Southwest had very little precipitation, with a few stations reporting no measurable amount for the entire month.

There were some marked differences in November rainfall in nearby localities. For example, Apalachicola, Fla., had 1.45 inches and nearby Pensacola 8.24 inches; Corpus Christi, Tex., 1.23 inches and Galveston 16.18 inches. Columbia, S. C., had about four times as much rain as nearby Savannah, Ga.